Application No.:
Docket No.: 066396-0059

PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

In re Application of	:	Customer Number: 20277
Michael J. ROBB, et al.	:	Confirmation Number: 8751
Application No.: 10/628,044	:	Tech Center Art Unit: 3661
Filed: July 25, 2003	:	Examiner: G. A. Jeanglaude

For: DIAGNOSING MALFUNCTIONING WHEEL ALIGNMENT SYSTEM

TRANSMITTAL OF AMENDED APPEAL BRIEF

Mail Stop Appeal Brief
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

This Amended Appeal Brief is submitted in response to the Notice of Non-Compliant Appeal Brief dated December 14, 2006.

To the extent necessary, a petition for an extension of time under 37 C.F.R. 1.136 is hereby made. Please charge any shortage in fees due under 37 C.F.R. 1.17 and 41.20, and in connection with the filing of this paper, including extension of time fees, to Deposit Account 500417 and please credit any excess fees to such deposit account.

Respectfully submitted,

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Mail Stop Appeal Brief
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

This Amended Appeal Brief is submitted in support of the Notice of Appeal, filed September 12, 2006, of the final rejection of claims 1 through 26.

I. REAL PARTY IN INTEREST

This application is assigned to Snap-on Technologies, Inc.

II. RELATED APPEALS AND INTERFERENCES

There are no related appeals or interferences.

III. STATUS OF CLAIMS

Claims 1 through 26 are pending. No claims have been cancelled. All claims stand rejected and are at issue in this appeal.

IV. STATUS OF AMENDMENTS

No amendment has been filed subsequent to the final Office Action dated June 21, 2006 (hereinafter "the Office Action").

V. SUMMARY OF INVENTION

The invention facilitates diagnosis of malfunctioning diagnostic equipment such as automotive alignment systems. Such complex diagnostic systems may be susceptible to malfunctions during use that may be difficult to detect or correct at a later time. An example of a wheel alignment system is described at paragraph [0008] of the specification. A variety of operational problems can be encountered due to the sensitivity of the various system components and the sheer number of components that must cooperate during operation of the system. Unfortunately, when malfunctions occur during use of such equipment, the operator may lack the skills necessary for diagnosing the malfunction or for correcting it. Technicians who service the equipment, on the other hand, who have the ability to diagnose and correct such problems may be unable to successfully troubleshoot operational problems because they were not present during the malfunction. By the time a service technician arrives on the premises, the problem may no longer be observable. Thus, problems that otherwise may be easily remedied are often solved by unnecessary and costly replacement of components erroneously thought to have been malfunctioning.

The invention provides a diagnostic system for troubleshooting a malfunction during operation of an instrument that gathers and analyzes real-time data, stores the real-time data, and plays back the real-time data after the real time data was gathered.

As exemplified in Fig. 1, information gathering devices, such as cameras 108 and 110, obtain wheel alignment data for each of the wheels 100, 102, 104, and 106 of a vehicle. The cameras are focused on individual sets of patterned optical targets, 112, 114, 116, and 118 that are respectively

mounted to the vehicle wheels. Lights 122 and 124 illuminate the targets sufficiently to reflect light for detection of the target images by the cameras. Electrical signals, corresponding to the images viewed by the cameras, are transferred to a processor, which correlates the perspective image of each of the targets with the true shape of each target. The processor relates the known geometric dimensions of the target with the dimensions of corresponding elements in the perspective images. This process is repeated for each of a plurality of different vehicle positions, such that wheel alignment parameters can be calculated from the collected data. See, for example, paragraphs [0025] and [0026] of the specification.

Malfunctions can occur due to intermittent or permanent hardware failures or to environmental disturbances that can interfere with a camera's or optical target's normal operation, causing the appearance of hardware failure. Fig. 2 illustrates a method for diagnosing a malfunction that occurs during the operation of an information gathering device after the malfunction occurs. Real-time data collection is stored during a malfunction event, which may be triggered by an alignment technician upon noticing a malfunction in the alignment process. The alignment system may be placed in a diagnostic mode, which causes the real-time data to be collected at pre-determined intervals, indicated at block 200. The frequency may be variable according to a variety of different patterns or triggers, such as pre-defined programmable triggers based upon out-of-tolerance conditions, deteriorating or improving conditions, and the like. Alternatively, the alignment system may always collect real-time data, keeping current data in memory while discarding older data. When a malfunction event occurs and the system switches to diagnostic mode, historical stored data is thus available to supplement the real-time data that is gathered in the diagnostic mode and stored at block 202. Reference is made to paragraph [0029] of the specification.

Information collected during the malfunction event is stored in memory 304 (Fig. 3), which may be permanent or temporary computer memory. A data replay system 306 presents the recalled data to a diagnostic technician, who is able to review the malfunction event and diagnose it by analyzing the real-time data that had been collected during the event. In this manner, the diagnostic technician is able to "recreate" the malfunction event. Thus, while the malfunction or apparent malfunction may have been intermittent, and may no longer be apparent, it can still be examined and diagnosed by an experienced technician who was not present when the event occurred. The data replay system may include a computer and a display screen for retrieving the stored data. The data can be analyzed by processing images, and displaying the data to the diagnostic technician.

As required by the Notice of Non-Compliant Appeal Brief, dated December 14, 2006, a "mapping" of claims 1, 6, 9, 15, 21, 22, 23, 24, 25 and 26 to specification by page and line number and drawings is as follows:

> 1. A diagnostic system for diagnosing a malfunction during the operation of an instrument that gathers and analyzes real-time data associated with a vehicle, the system comprising:
>
> one or more information-gathering devices for gathering the real-time data associated with the instrument; [*page 6, paragraph 25, line 5, Fig. 1*]
>
> a memory device in communication with the information-gathering devices for storing the real-time data associated with the instrument; and [*page 9, paragraph 32, line 1, Fig. 3A*]
>
> a data replay system in communication with the memory device for playing back the real-time data associated with the instrument after the real time data associated with the vehicle or the instrument was gathered. [*page 9, paragraph 32, line 2, Fig. 3A*]
>
> 6. A diagnostic system for allowing a service technician to diagnose a malfunction during operation by an operator of a wheel alignment system that gathers information in real time about the alignment of a plurality of wheels comprising:
>
> one or more cameras for gathering images of the alignment in real time, the images including a target mounted on a wheel; [*page 6, paragraph 25, lines 3-5, Fig. 1*]

a processing system in communication with the cameras for receiving the images and for generating analysis data based on the images, the analysis data providing an analysis of the alignment of the wheels; [*page 10, paragraph 34, line 4, Fig. 4*]

a memory device for storing the images or the analysis data; [*page 10, paragraph 34, line 6, Fig. 4*]

a storage control for causing the memory device to store the images and the analysis data in response to activation of the storage control by the operator during the occurrence of the malfunction; [*page 10, paragraph 34, lines 6-7, Fig. 4*]

a display device in communication with the memory device for selectively displaying the images and the analysis data; and [*page 10, paragraph 35, line 2, Fig. 4*]

a play-back control for causing the display device to selectively display the images and the analysis data to the service technician in response to activation of the play-back control after the occurrence of the malfunction. [*page 10, paragraph 35, line 4, Fig. 4*]

9. A method of diagnosing a malfunction during the operation of an instrument that gathers and analyzes real-time wheel alignment data comprising:

receiving real-time wheel alignment data from at least one information-gathering device; [*page 10, paragraph 34, lines 2-4, Fig. 4*]

storing the real-time wheel alignment data in a memory device; [*page 10, paragraph 34, lines 6-8, Fig. 4*]

re-playing the stored, real-time wheel alignment data; and [*page 10, paragraph 35, lines 4-6, Fig. 4*]

analyzing the re-played data to diagnose a malfunction. [*pages 10 -11, paragraph 36, all, Fig. 4*]

15. A means for diagnosing a malfunction during the operation of an instrument that gathers and analyzes real-time wheel alignment data comprising:

receiving means for receiving real-time wheel alignment data from at least one information-gathering means; [*page 10, paragraph 34, lines 2-4, Fig. 4*]

storage means for storing the real-time wheel alignment data; [*page 10, paragraph 34, lines 6-8, Fig. 4*]

playback means for re-playing the stored, real-time wheel alignment data; and [*page 10, paragraph 35, lines 4-6, Fig. 4*]

processor means for analyzing the re-played data to diagnose a malfunction. [*page 10, paragraph 34, line 6, Fig. 4*]

21. A diagnostic system for allowing a service technician to diagnose a malfunction during operation by an operator of a wheel alignment system that gathers information in real time about the alignment of a plurality of wheels comprising:

one or more sensors for generating images of a target mounted on each of the plurality of wheels; [*page 6, paragraph 25, line 5, Fig. 1*]

a processing system in communication with the sensors for receiving the images and for generating analysis data based on the images, the analysis data providing an analysis of the alignment of the wheels; [*page 10, paragraph 34, lines 4-6, Fig. 4*]

a memory device for storing the images or the analysis data; [*page 10, paragraph 34, line 6, Fig. 4*]

a storage control for causing the memory device to store the images or the analysis data; [*page 10, paragraph 34, lines 6-7, Fig. 4*]

a display device in communication with the memory device for selectively displaying the images or the analysis data; and [*page 10, paragraph 35, line 2, Fig. 4*]

a play-back control for causing the display device to selectively display the images or the analysis data in response to activation of the play-back control. [*page 10, paragraph 35, lines 4-6, Fig. 4*]

22. A vehicle service system for allowing a service technician to diagnose a malfunction comprising:

one or more sensors for generating images associated with a vehicle; [*page 6, paragraph 25, line 5, Fig. 1*]

a processing system in communication with the sensors for receiving the images or for generating analysis data based on the images, the analysis data providing an analysis of geometric parameters associated with the vehicle; [*page 10, paragraph 34, lines 4-6, Fig. 4*]

a memory device for storing the images or the analysis data; [*page 10, paragraph 34, line 6, Fig. 4*]

a storage control for causing the memory device to store the images or the analysis data; [*page 10, paragraph 34, lines 6-7, Fig. 4*]

a display device in communication with the memory device for selectively displaying the images or the analysis data; and [*page 10, paragraph 35, line 2, Fig. 4*]

a play-back control for causing the display device to selectively display the images or the analysis data in response to activation of the play-back control. [*page 10, paragraph 35, lines 4-6, Fig. 4*]

23. A vehicle service system allowing a service technician to diagnose a malfunction comprising:

one or more sensing means for generating images associated with a vehicle; [*page 6, paragraph 25, line 5, Fig. 1*]

a processing system in communication with the sensing means for receiving the images and for generating analysis data based on the

images, the analysis data providing an analysis of geometric parameters associated with the vehicle; [*page 10, paragraph 34, lines 4-6, Fig. 4*]

data storage means for storing the images or the analysis data; [*page 10, paragraph 34, line 6, Fig. 4*]

storage control means for causing the data storage means to store the images or the analysis data; [*page 10, paragraph 34, lines 6-7, Fig. 4*]

display means in communication with the data storage means for selectively displaying the images or the analysis data; and [*page 10, paragraph 35, line 2, Fig. 4*]

play-back control means for causing the display means to selectively display the images or the analysis data in response to activation of the play-back control. [*page 10, paragraph 35, lines 4-6, Fig. 4*]

24. A system for diagnosing a malfunction during the operation of a vehicle test instrument comprising:

means for receiving real-time data associated with the operations of the vehicle test instrument; [*page 6, paragraph 25, line 5, Fig. 1*]

a memory device for storing the real-time data; [*page 10, paragraph 34, line 6, Fig. 4*]

means for re-playing the stored, real-time data; and [*page 10, paragraph 35, lines 4-6, Fig. 4*]

a data processor for analyzing the re-played data to diagnose a malfunction of the vehicle test instrument. [*page 10, paragraph 34, lines 4-6, Fig. 4*]

25. A vehicle service system allowing a service technician to diagnose a malfunction comprising:

at least one sensing devices for sensing real-time signals associated with a vehicle or the operations of the vehicle service system; [*page 6, paragraph 25, line 5, Fig. 1*]

a processing system configured to be in communication with the at least one sensing device for receiving the sensed signals and for generating analysis data based on the sensed signals, the analysis data providing an analysis of the vehicle or the operations of the vehicle service system; [*page 10, paragraph 34, lines 4-6, Fig. 4*]

a data storage device for storing the sensed signals or the analysis data; [*page 10, paragraph 34, line 6, Fig. 4*]

a storage control device for causing the data storage device to store the sensed signals; [*page 10, paragraph 34, lines 6-7, Fig. 4*]

a display device; and [*page 10, paragraph 35, line 2, Fig. 4*]

a play-back control device configured to be in communication with the data storage device or the display device, for causing the display device to selectively display the sensed signals stored in the data storage device. [*page 10, paragraph 35, lines 4-6, Fig. 4*]

26. A diagnostic system for diagnosing a malfunction during the operation of an instrument that gathers and analyzes real-time data associated with a vehicle, the system comprising:

one or more information-gathering devices for gathering the real-time data associated with the vehicle or the instrument; [*page 6, paragraph 25, line 5, Fig. 1*]

a memory device in communication with the information-gathering devices for storing the real-time data associated with the vehicle or the instrument; and [*page 10, paragraph 34, line 6, Fig. 4*]

a data replay system in communication with the memory device for playing back the real-time data associated with the vehicle or the instrument after the real time data associated with the vehicle or the instrument was gathered; [*page 10, paragraph 35, lines 4-6, Fig. 4*]

wherein the one or more information-gathering devices includes an imaging device for gathering images associated with the vehicle or the instrument. [*page 6, paragraph 25, line 5, Fig. 1*]

VI. GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL

Claims 1, 9, 15, and 24 through 26 stand rejected under 35 U.S.C. § 102(e) as being anticipated by U.S. 6,370,455 (hereinafter "Larson").

Claims 2 through 8, 10 through 14 and 16 through 23 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Larson in view of U.S. patent 5,809,658 (hereinafter "Jackson").

VII. ARGUMENT

Legal precedent is well developed on the subjects of lack of novelty and of obviousness in the application of rejections, respectively, under 35 U.S.C. §102 and 103.

The factual determination of lack of novelty under 35 U.S.C. § 102 requires the identical disclosure in a single reference of each element of a claimed invention, such that the identically claimed invention is placed into the recognized possession of one having ordinary skill in the art. *Dayco Prods., Inc. v. Total Containment, Inc.*, 329 F.3d 1358, 66 USPQ2d 1801 (*Fed. Cir.* 2003); *Crown Operations International Ltd. v. Solutia Inc.*, 289 F.3d 1367, 62 *USPQ2d* 1917 (*Fed. Cir.* 2002). When imposing a rejection under 35 U.S.C. § 102, the Examiner is required to specifically

identify wherein an applied reference identically discloses each and every feature of a claimed invention, particularly when such is not apparent. *In re Rijckaert, 9 F.3d 1531, 28 USPQ2d 1955 (Fed. Cir. 1993); Lindemann Maschinenfabrik GMBH v. American Hoist & Derrick Co., 730 F.2d 1452, 221 USPQ 481 (Fed. Cir. 1984).*

It is incumbent upon the examiner to factually support a conclusion of obviousness under 35 U.S.C. § 103. *In re Mayne,* 104 F.3d 1339, 41 USPQ2d 1451 (Fed. Cir. 1997*); In re Oetiker*, 977 F.2d 1443, 24 USPQ2d 1443 (Fed. Cir. 1992). The examiner must provide a reason why one having ordinary skill in the art would have been led to modify a particular prior art reference in a particular manner to arrive at a particular claimed invention; *Ecolochem Inc. v. Southern California Edison, Co.*, 227 F.3d 361, 56 USPQ2d 1065 (Fed. Cir. 2000); *In re Rouffet*, 149 F.3d 1350, 47 USPQ2d 1453 (Fed. Cir. 1998). *Ashland Oil, Inc. v. Delta Resins & Refractories, Inc.*, 776 F.2d 281, 227 USPQ 657 (Fed. Cir. 1985); *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988); *Stratoflex, Inc. v. Aeroquip Corp.*, 713 F.2d 1530, 218 USPQ 871 (Fed. Cir. 1983); *In re Warner*, 379 F.2d 1011, 154 USPQ 173 (CCPA 1967).

In order to establish the requisite motivation, "clear and particular" factual findings must be made as to a specific understanding or specific technological principle which would have realistically compelled one having ordinary skill in the art to modify a particular reference to arrive at the claimed invention, based upon facts, not generalizations. *Ruiz v. A.B. Chance Co.*, 234 F.3d 654, 57 UPSQ2d 1161 (Fed. Cir. 2000); *Ecolochem Inc. v. Southern California Edison, Co.* 227 F.3d 361, 56 USPQ2d 1065 (Fed. Cir. 2000); *In re Kotzab*, 217 F.3d 1365, 55 USPQ 1313 (Fed. Cir. 2000); *In re Dembiczak*, 175 F.3d 994, 50 USPQ2d 1614 (Fed. Cir. 1999). Whether the prior art may be capable of modification, and what may or may not be known in general, do not establish the requisite realistic motivation for obviousness; see *In re Deuel*, 51 F.3d 1552, 34 USPQ2d 1210 (Fed. Cir. 1995). The

question is not what one having ordinary skill in the art could or could not do, but, rather, why would one having ordinary skill in the art have been realistically impelled to deviate from the express teachings of Larson to arrive at the claimed invention. *Gentry Gallery v. Berkline*, 134 F.3d 1473, 45 USPQ2d 1498 (Fed. Cir. 1998); *In re Fritch*, 972 F.2d 1260, 23 USPQ2d 1780 (Fed. Cir. 1992).

It is respectfully submitted that the record has not met the established criteria for a determination of anticipation under 35 U.S.C. § 102 or of obviousness under 35 U.S.C. § 103.

A. The rejection of claims 1, 9, 15, and 24 through 26 under 35 U.S.C. § 102(e) as being anticipated by Larson

At issue is whether Larson discloses gathering real-time data for an instrument and playing back real-time data associated with the instrument after the real-time data was gathered and similar requirements, as excerpted below for each of these independent claims.

1. Claims 1 and 26 recite, *inter alia*, the following:

> A diagnostic system for diagnosing a malfunction during the operation of an instrument that gathers and analyzes real-time data . . .:
> . . . gathering the real-time data associated with the instrument;
> . . . storing the real-time data associated with the instrument; and
> . . . for playing back the real-time data associated with the instrument after the real time data . . . was gathered.

2. Claims 9, 15 and 24 recite, *inter alia*, the following:

> . . . receiving real-time wheel alignment data . . .;
> storing the real-time wheel alignment data in a memory device;
> re-playing the stored, real-time wheel alignment data; and
> analyzing the re-played data to diagnose a malfunction.

3. Claim 25 recites, *inter alia*, the following:

> . . . sensing real-time signals . . .;
> . . . receiving the sensed signals and for generating analysis data based on the sensed signals . . .;
> . . . storing the sensed signals or the analysis data;
> . . . a display device; and
> . . . causing the display device to selectively display the sensed signals stored . . .

The terms "real-time data" and "real-time signals" are described and defined by the specification disclosure. For example, reference is made to paragraph [0029], which is reproduced herein in part as follows:

> The data collection occurs during a malfunction event, and is triggered by an alignment technician upon noticing a malfunction in the alignment process. When a malfunction is detected, the alignment system may be placed in a diagnostic mode, which causes the *real-time* data to be collected at regular, pre-determined intervals, indicated at block 200. For example, the data may be collected once every two seconds for the first 10 seconds, once every four seconds during the following 8 seconds, and once every five seconds thereafter. Of course, the disclosures herein are applicable to any data collection frequency, and the frequency need not diminish over time. The frequency may be variable according to a variety of different patterns or triggers, such as pre-defined programmable triggers based upon out-of-tolerance conditions, deteriorating or improving conditions, and the like. Also, the alignment system *may always collect real-time data*, keeping a certain amount of it in memory while discarding older data, so that *some amount of real-time data* is constantly scrolled through the system's memory. That way, when a malfunction event does occur and the system switches to diagnostic mode, it will have some amount of historical data to supplement *the real-time data* it gathers in the diagnostic mode. It is also possible to pre-define various triggers for initiating the diagnostic mode data collection and storage, such as triggers based upon data levels indicative of certain conditions, and to begin capturing the data after a trigger is detected. The triggers can include an out of tolerance condition or a deteriorating condition (emphasis provided).

These terms are discussed similarly throughout the specification. In short, the term real-time data is defined in the present disclosure as data that recreates events that occur in real-time, such data being of particular interest for operation that occurred during the period of malfunction.

It is submitted that Larson does not disclose the claimed subject matter reproduced above. The Office Action, at page 2, reads the claimed elements on the Larson disclosure, relying primarily on Fig. 1 and column 8 of the specification. The position stated in the Office Action is that the phrase "log files for performing error-detection (at line 34)," coupled with the description of detection of an error condition during analysis (in the next full paragraph), connotes playback of real time data. Issue is taken with this holding.

While Larson stores data, such as "program log files," there is no disclosure or suggestion that these log files (or other stored data) comprise real-time data. At column 8, Larson describes useful information *extracted* from the transmitted data to include:

> ...identification of failed hardware components in the wheel alignment system, wheel aligner status information such as hardware and software configurations, and wheel aligner usage information which may be accumulated over a period of time. For example, information accumulated over a period of time related to the usage of the wheel alignment system may include statistical information identifying the number and type of wheel alignment procedures performed, specific information as to the makes and models of vehicles repaired or serviced, and usage information for individual features or components of the wheel alignment system. Additional information which the remote system software may be configured to retrieve from the wheel alignment computer may include software application and database version numbers, elapsed time since the associated wheel alignment hardware has been calibrated, and current program log files for performing error-detection.

Larson's description of "accumulated information over a period of time" does not suggest gathering real-time data associated with an individual apparatus, while operating with respect to a particular vehicle, when a malfunction occurs. Rather this information is characterized by Larson as usage of the wheel alignment system that provides statistical information, identifying the number and type of wheel alignment procedures performed, specific information as to the makes and models of vehicles repaired or serviced, etc. Larson's "useful information" is extracted from transmitted data.

While data are accumulated over time, only some of the data are extracted, an operation that would contradict playing back real-time data.

Moreover, it is submitted that there is no description in Larson of a replay system for playing back the real-time data that not only is associated with the instrument (e.g., the wheel alignment system) but, by extension, must also be associated with a particular vehicle under test during the malfunction event. In addition, there is no description in Larson of play back of the real time data after the real time data was gathered. The second paragraph of column 8 discusses issuance of diagnostic functions after detection of an error function. Results are then transmitted for analysis. There is nothing in this paragraph to suggest that the transmitted results comprise real-time data, let alone a suggestion to replay real-time data obtained prior to detection of the error.

It is submitted, therefore, that lack of novelty of claims 1, 9, 15, and 24 through 26 under 35 U.S.C. § 102 has not been established.

B. The rejection of claims 2 through 8, 10 through 14 and 16 through 23 under 35 U.S.C. § 103 as being unpatentable over Larson in view of Jackson.

Claims 2 through 8, 10 through 14 and 16 through 20 are dependent from respective independent claims discussed in section A supra. The Jackson patent has been relied upon for disclosing the wheel alignment details required by these dependent claims and for concluding that it would have been obvious to provide such a wheel alignment system in the Larson system. The Jackson patent does not disclose the real time playback feature required by the independent claims, nor has the Office Action taken such a position with respect to Jackson.

Independent claims 21 through 23 require generating data associated with a vehicle and sensed during a malfunction of a system malfunction and a play-back control for subsequently displaying

images or analysis data for the generated data. Neither Larson nor Jackson, taken individually or in combination, disclose or suggest these claimed requirements.

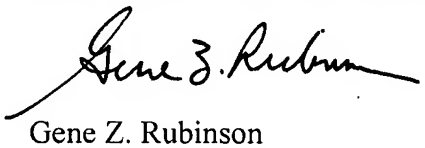
It is submitted, therefore, the record does not establish *prima facie* obviousness claims 2 through 8, 10 through 14 and 16 through 23 in accordance with 35 U.S.C. § 103 and the legal precedents discussed above.

VIII. CONCLUSION

In summary, based upon the arguments submitted *supra*, Appellant respectfully submits that the rejections of all pending claims imposed under 35 U.S.C. §§ 102 and 103 are not legally viable. Reversal of the rejection is respectfully solicited.

Respectfully submitted,

McDERMOTT WILL & EMERY LLP



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IX. CLAIMS APPENDIX

1. A diagnostic system for diagnosing a malfunction during the operation of an instrument that gathers and analyzes real-time data associated with a vehicle, the system comprising:

one or more information-gathering devices for gathering the real-time data associated with the instrument;

a memory device in communication with the information-gathering devices for storing the real-time data associated with the instrument; and

a data replay system in communication with the memory device for playing back the real-time data associated with the instrument after the real time data associated with the vehicle or the instrument was gathered.

2. The diagnostic system of claim 1, wherein the one or more information-gathering devices includes a camera focused on an optical target in a wheel alignment system.

3. The diagnostic system of claim 2 wherein the real-time data comprises a plurality of images gathered from the camera.

4. The diagnostic system of claim 1, further comprising:

a data controller in communication with the information-gathering devices and the memory device that causes the memory device to store data from the information-gathering devices at pre-determined time intervals.

5. The diagnostic system of claim 3, wherein the pre-determined time intervals vary in frequency over time.

6. A diagnostic system for allowing a service technician to diagnose a malfunction during operation by an operator of a wheel alignment system that gathers information in real time about the alignment of a plurality of wheels comprising:

one or more cameras for gathering images of the alignment in real time, the images including a target mounted on a wheel;

a processing system in communication with the cameras for receiving the images and for generating analysis data based on the images, the analysis data providing an analysis of the alignment of the wheels;

a memory device for storing the images or the analysis data;

a storage control for causing the memory device to store the images and the analysis data in response to activation of the storage control by the operator during the occurrence of the malfunction;

a display device in communication with the memory device for selectively displaying the images and the analysis data; and

a play-back control for causing the display device to selectively display the images and the analysis data to the service technician in response to activation of the play-back control after the occurrence of the malfunction.

7. The diagnostic system of claim 6 wherein the storage control causes the storage of the images or the analysis data to be accomplished at predetermined intervals.

8. The diagnostic system of claim 7 wherein the pre-determined intervals vary in frequency over time.

9. A method of diagnosing a malfunction during the operation of an instrument that gathers and analyzes real-time wheel alignment data comprising:

receiving real-time wheel alignment data from at least one information-gathering device;

storing the real-time wheel alignment data in a memory device;

re-playing the stored, real-time wheel alignment data; and

analyzing the re-played data to diagnose a malfunction.

10. The method of claim 9 wherein the at least one information gathering device includes a video camera.

11. The method of claim 9 wherein the real-time wheel alignment data comprises images of a target mounted on a wheel.

12. The method of claim 9, further comprising:

processing the real-time wheel alignment data to generate wheel alignment analysis data;

storing the wheel alignment analysis data;

re-playing the wheel alignment analysis data in conjunction with the re-playing of the real-time wheel alignment data; and

analyzing the re-played wheel alignment analysis data to diagnose a malfunction.

13. The method of claim 9 further comprising transmitting the stored, real-time wheel alignment data across a communications network prior to re-playing it.

14. The method of claim 9 wherein the storing of real-time wheel alignment data in a memory device is done at pre-determined intervals that vary in frequency over time.

15. A means for diagnosing a malfunction during the operation of an instrument that gathers and analyzes real-time wheel alignment data comprising:

receiving means for receiving real-time wheel alignment data from at least one information-gathering means;

storage means for storing the real-time wheel alignment data; playback means for re-playing the stored, real-time wheel alignment data; and

processor means for analyzing the re-played data to diagnose a malfunction.

16. The diagnostic means of claim 15 wherein the at least one means for gathering information gathering includes an imaging means.

17. The diagnostic means of claim 16 wherein the real-time wheel alignment data comprises images including an image of an optical target mounted on a wheel.

18. The diagnostic means of claim 15 wherein the processor means is a first processor means, the diagnostic means further comprising:

a second processor means for processing the real-time wheel alignment data to generate wheel alignment analysis data;

storage means for storing the wheel alignment analysis data; the playback means further configured for re-playing the wheel alignment analysis data in conjunction with the re-playing of the real-time wheel alignment data; and

the first processor means further configured for analyzing the re-played wheel alignment analysis data to diagnose a malfunction.

19. The diagnostic means of claim 15 further comprising a transmitting means for transmitting the stored, real-time wheel alignment data across a communications network prior to re-playing it.

20. The diagnostic means of claim 15 wherein the storage means includes a controller means for causing the storing of wheel alignment data to be performed at pre-determined intervals that vary in frequency over time.

21. A diagnostic system for allowing a service technician to diagnose a malfunction during operation by an operator of a wheel alignment system that gathers information in real time about the alignment of a plurality of wheels comprising:

one or more sensors for generating images of a target mounted on each of the plurality of wheels;

a processing system in communication with the sensors for receiving the images and for generating analysis data based on the images, the analysis data providing an analysis of the alignment of the wheels;

a memory device for storing the images or the analysis data;

a storage control for causing the memory device to store the images or the analysis data;

a display device in communication with the memory device for selectively displaying the images or the analysis data; and

a play-back control for causing the display device to selectively display the images or the analysis data in response to activation of the play-back control.

22. A vehicle service system for allowing a service technician to diagnose a malfunction comprising:

one or more sensors for generating images associated with a vehicle;

a processing system in communication with the sensors for receiving the images or for generating analysis data based on the images, the analysis data providing an analysis of geometric parameters associated with the vehicle;

a memory device for storing the images or the analysis data;

a storage control for causing the memory device to store the images or the analysis data;

a display device in communication with the memory device for selectively displaying the images or the analysis data; and

a play-back control for causing the display device to selectively display the images or the analysis data in response to activation of the play-back control.

23. A vehicle service system allowing a service technician to diagnose a malfunction comprising:

one or more sensing means for generating images associated with a vehicle;

a processing system in communication with the sensing means for receiving the images and for generating analysis data based on the images, the analysis data providing an analysis of geometric parameters associated with the vehicle;

data storage means for storing the images or the analysis data;

storage control means for causing the data storage means to store the images or the analysis data;

display means in communication with the data storage means for selectively displaying the images or the analysis data; and

play-back control means for causing the display means to selectively display the images or the analysis data in response to activation of the play-back control.

24. A system for diagnosing a malfunction during the operation of a vehicle test instrument comprising:

means for receiving real-time data associated with the operations of the vehicle test instrument;

a memory device for storing the real-time data;

means for re-playing the stored, real-time data; and

a data processor for analyzing the re-played data to diagnose a malfunction of the vehicle test instrument.

25. A vehicle service system allowing a service technician to diagnose a malfunction comprising:

at least one sensing devices for sensing real-time signals associated with a vehicle or the operations of the vehicle service system;

a processing system configured to be in communication with the at least one sensing device for receiving the sensed signals and for generating analysis data based on the sensed signals, the analysis data providing an analysis of the vehicle or the operations of the vehicle service system;

a data storage device for storing the sensed signals or the analysis data;

a storage control device for causing the data storage device to store the sensed signals;

a display device; and

a play-back control device configured to be in communication with the data storage device or the display device, for causing the display device to selectively display the sensed signals stored in the data storage device.

26. A diagnostic system for diagnosing a malfunction during the operation of an instrument that gathers and analyzes real-time data associated with a vehicle, the system comprising:

one or more information-gathering devices for gathering the real-time data associated with the vehicle or the instrument;

a memory device in communication with the information-gathering devices for storing the real-time data associated with the vehicle or the instrument; and

a data replay system in communication with the memory device for playing back the real-time data associated with the vehicle or the instrument after the real time data associated with the vehicle or the instrument was gathered;

wherein the one or more information-gathering devices includes an imaging device for gathering images associated with the vehicle or the instrument.

X. EVIDENCE APPENDIX

No evidence has been submitted of record under 37 CFR 1.130, 1.131 or 1.132.

XI. RELATED PROCEEDINGS APPENDIX

No decisions have been rendered in Related Appeals or Interferences.